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10/577,754

04/27/2006

Sunil G. Warrior

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SUITE 1201

NEW HAVEN, CT 06510

EXAMINER

MARKS, JACOB B

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

05/14/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|---------------------------------------|--|
| Office Action Summary | Application No. 10/577,754 | Applicant(s) WARRIER ET AL. | |
| | Examiner JACOB MARKS | Art Unit 1795 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11-19-07; 3-11-09</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

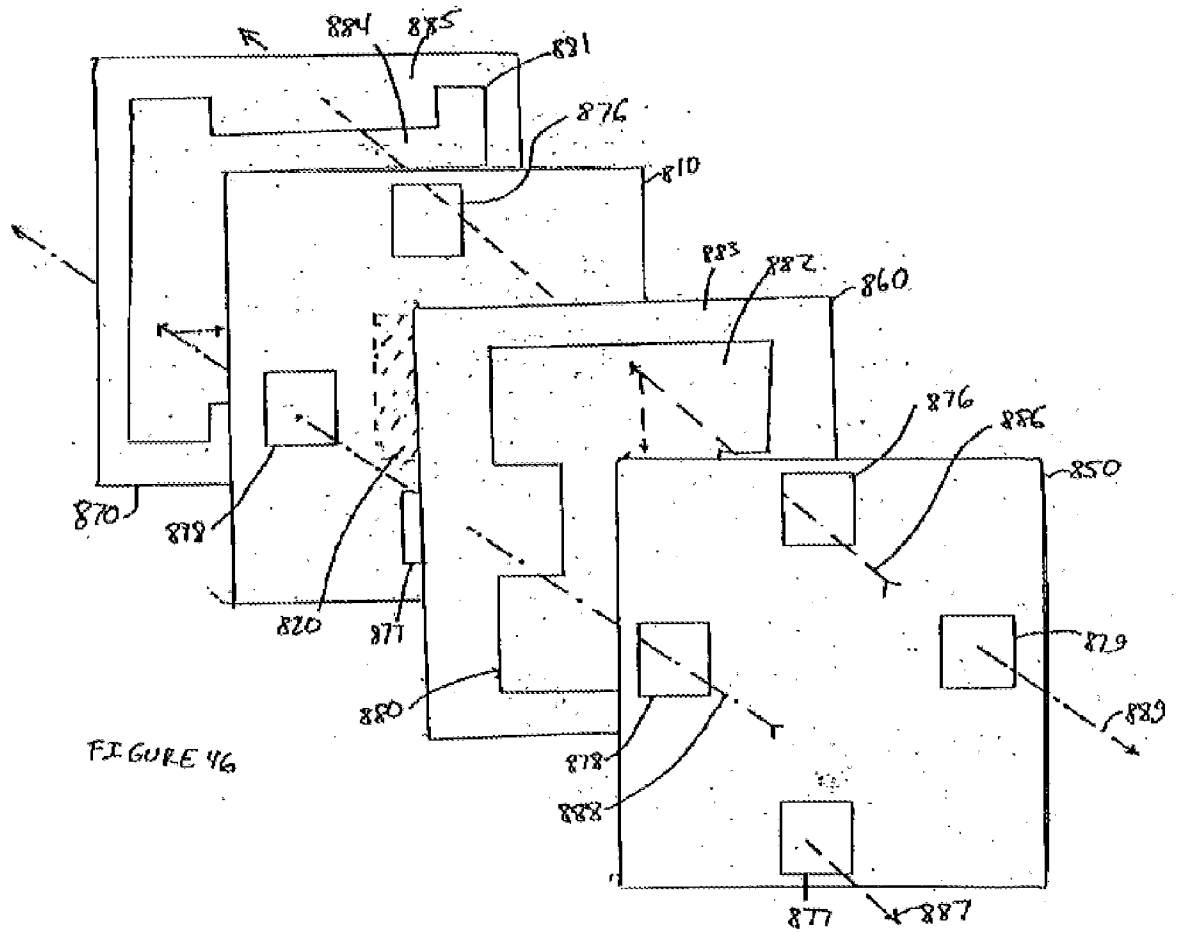
(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, 8, 11, 12, and 15-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Finn et al. (US Pat. Pub. No. 2003/0224238).

Regarding claims 1 and 17, Finn et al. disclose a solid oxide fuel cell (abstract) stacks (par. 248) comprising: a solid oxide fuel cell having an anode 820 (anode side) and a cathode 830 (cathode side) (par. 268; fig. 37). Finn et al. also disclose separator 50 that acts as a frame around the cathode and the anode sides (fig. 37; par. 261). Finn et al. further disclose an electrolyte 810 that acts as a bipolar separator, i.e. bipolar plate (par. 268; 279; fig. 46). Finn et al. also disclose anode conductor 860 (interconnect) that is adjacent to the anode side of separator 50 (anode side frame) and a cathode conductor 870 (interconnect) that is adjacent to the cathode side of separator 50 (cathode side frame) (par. 259-260). Finn et al. further disclose a cathode seal 845 between cathode 830 (fuel cell) and the cathode side of separator 50 (cathode side frame) and an anode seal 840 between anode 820 (fuel cell) and the anode side of separator 50 (anode side frame) (see figs 36 & 38). Finn et al. also disclose that the

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anode conductor 860 (anode interconnect) and cathode conductor 870 (cathode interconnect) are made of compliant felt material (par. 250).



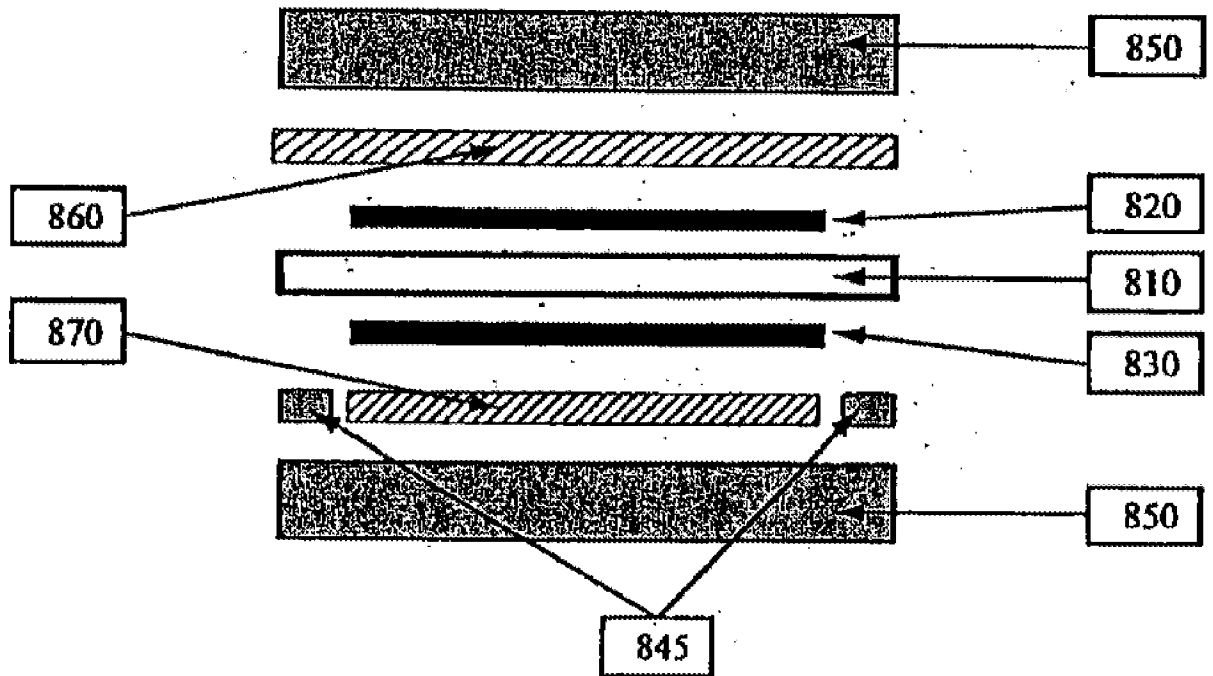


FIGURE 37

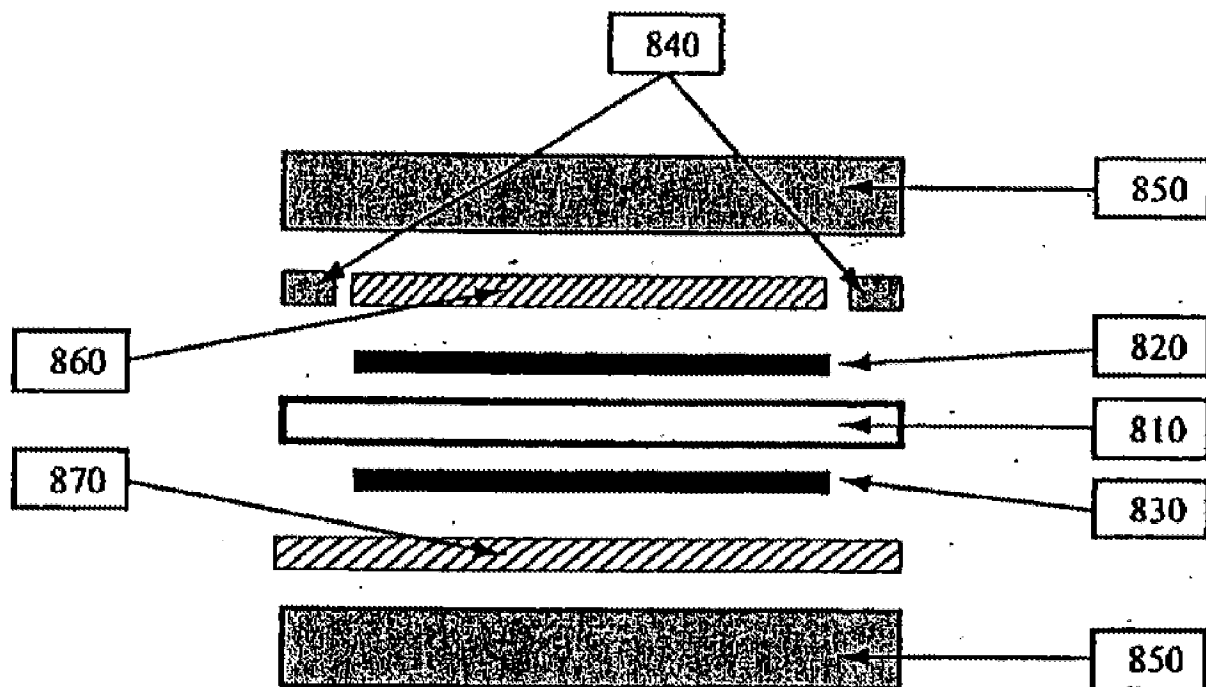


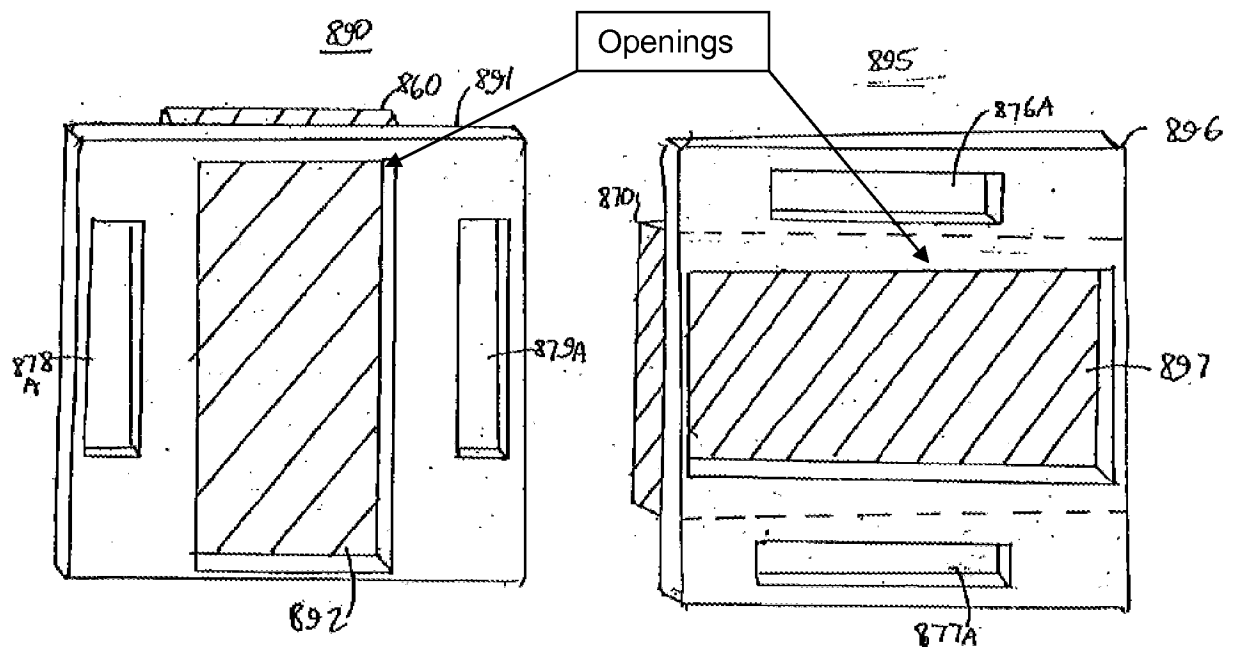
FIGURE 38

Regarding claim 2, it is inherent that the anode conductor 860 (anode interconnect) and cathode conductor 870 (cathode interconnect) would be compliant in three dimensions as the felt material from which they are made is compliant (par. 250).

Regarding claims 3, 15, and 16 Finn et al. discloses that the cathode conductor 870 (cathode interconnect) and the anode conductor 860 (anode interconnect) are made of compliant material (par. 250). Finn et al. further disclose that the felt conductors (interconnect) may also serve as the seal thereby making the cathode seal 845 and anode seal 840 compliant as well (par. 247 & 250). These compliant seals would inherently be floating seals.

Regarding claim 4, Finn et al. disclose that the frame 890 about the anode conductor 860 and the frame 895 about the cathode current conductor 870, which is inherently part of the same frame as separator 50, have openings inside of which the fuel cells are held (see fig. 47).

FIGURE 47



Regarding claim 8, Finn et al. disclose that the cathode side seal 845 is a substantially flat compliant member (see fig. 36; par. 253). Finn et al. also disclose that the cathode conductor 870 may be part of the sealing structure, thereby making the seal compliant as well (par. 250).

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Regarding claims 11 and 12, Finn et al. disclose gas passages 876a, 877a, 878a, and 879a (reactant slots) for oxidizer and fuel inlet and outlet flow (par. 228-229). Such passages are positioned around the openings.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Finn et al.

Regarding claims 5 and 6, Finn et al. does not specifically indicate preferred dimensions of the fuel cell. However, merely changing the size of an apparatus is not sufficient to establish patentability over the prior art. See, *in re Rose*, 220 F.2d 459, 105; MPEP § 2144.04(IV)(A). Therefore it would have been obvious to one of ordinary skill in the art to change the size of the openings (see fig. 47) of Finn et al. to be 4x4 inches

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or 8x8 inches because changing the size of an apparatus is not novel absent some unexpected result.

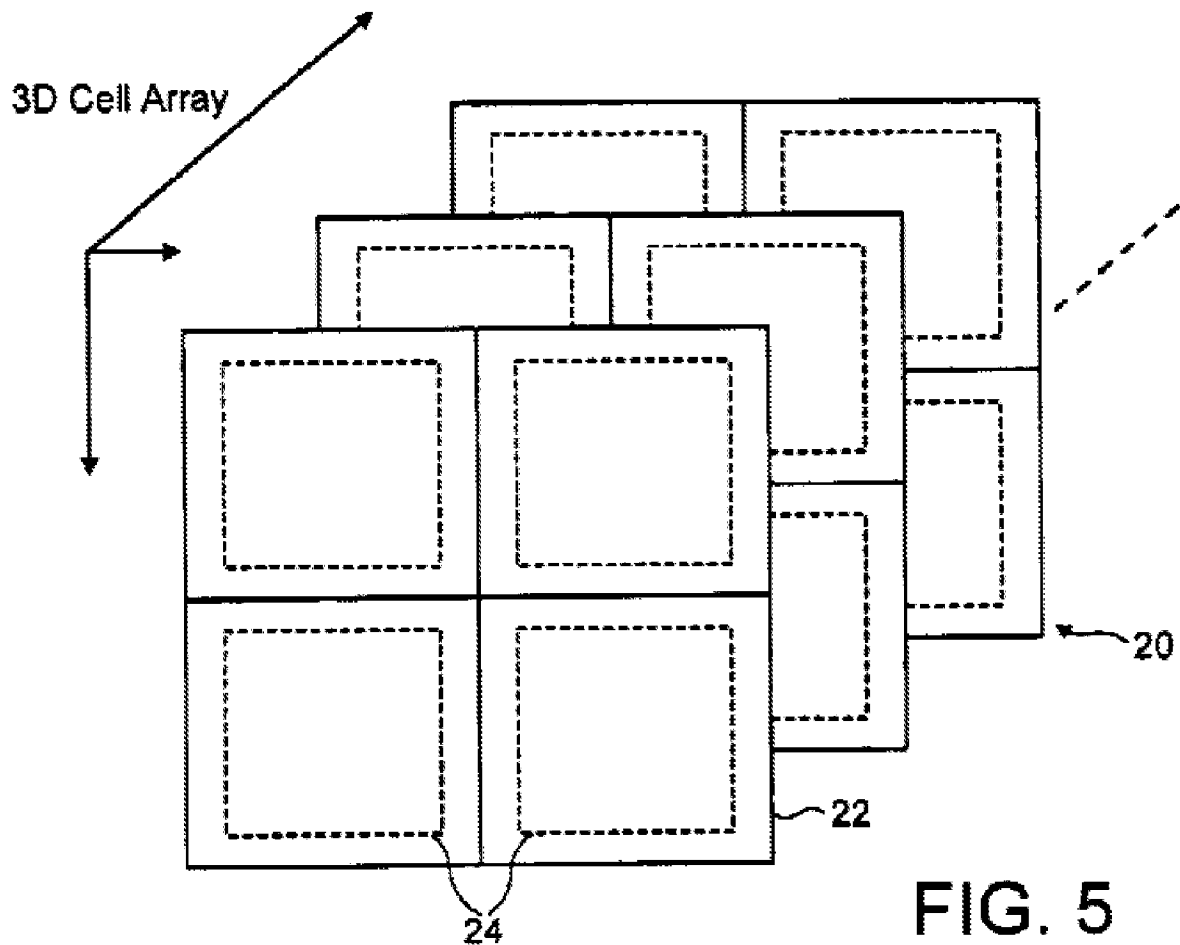
Regarding claim 7, Finn et al. discloses that the conductive cathode 870 (interconnect) may be part of the seal thereby making the seal compliant as well (par. 250). The seventh embodiment of Finn et al. does not specifically teach that the seal may be placed in a groove. However, the sixth embodiment of Finn et al. teach that the felt seal may be placed in a groove of the mating structure (par. 246). One of ordinary skill in would recognize that placing the anode seal 840 in a groove in the frame would have the advantage of forming a better seal. Therefore, it would have been obvious to one of ordinary skill in the art to place the anode seal 840 into a groove on the anode side of the frame in order to form a better seal.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) over Finn et al. as applied to claims 1 and 8, further in view of Steele et al. (US Pat. No. 6,794,075).

Regarding claims 9 and 10, Finn et al. disclose that the cathode side and the anode side of the frame portion illustrated in fig. 47, which is inherently a part of the frame 850, have an opening coinciding with the respective anode 820 and cathode 830 (fuel cell). Furthermore, the cathode seal 845 (cathode side seal) and anode seal 840 (anode side seal) would inherently be positioned inside of the openings shown in fig. 47. Finn et al. does not disclose that there is a plurality of openings. However, Steele et al. disclose that a several solid oxide fuel cells may be placed in an array with several openings (see fig. 5; col. 7 lines 25-60). Steele et al. discloses that creating an array of multiple smaller fuel cells reduces problems due to shrinkage and cracking (col. 7 lines

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25-60). Therefore, it would have been obvious to one of ordinary skill in the art to make the fuel cell of Finn et al. into a multiple cell array in order to reduce problems with shrinkage and cracking.



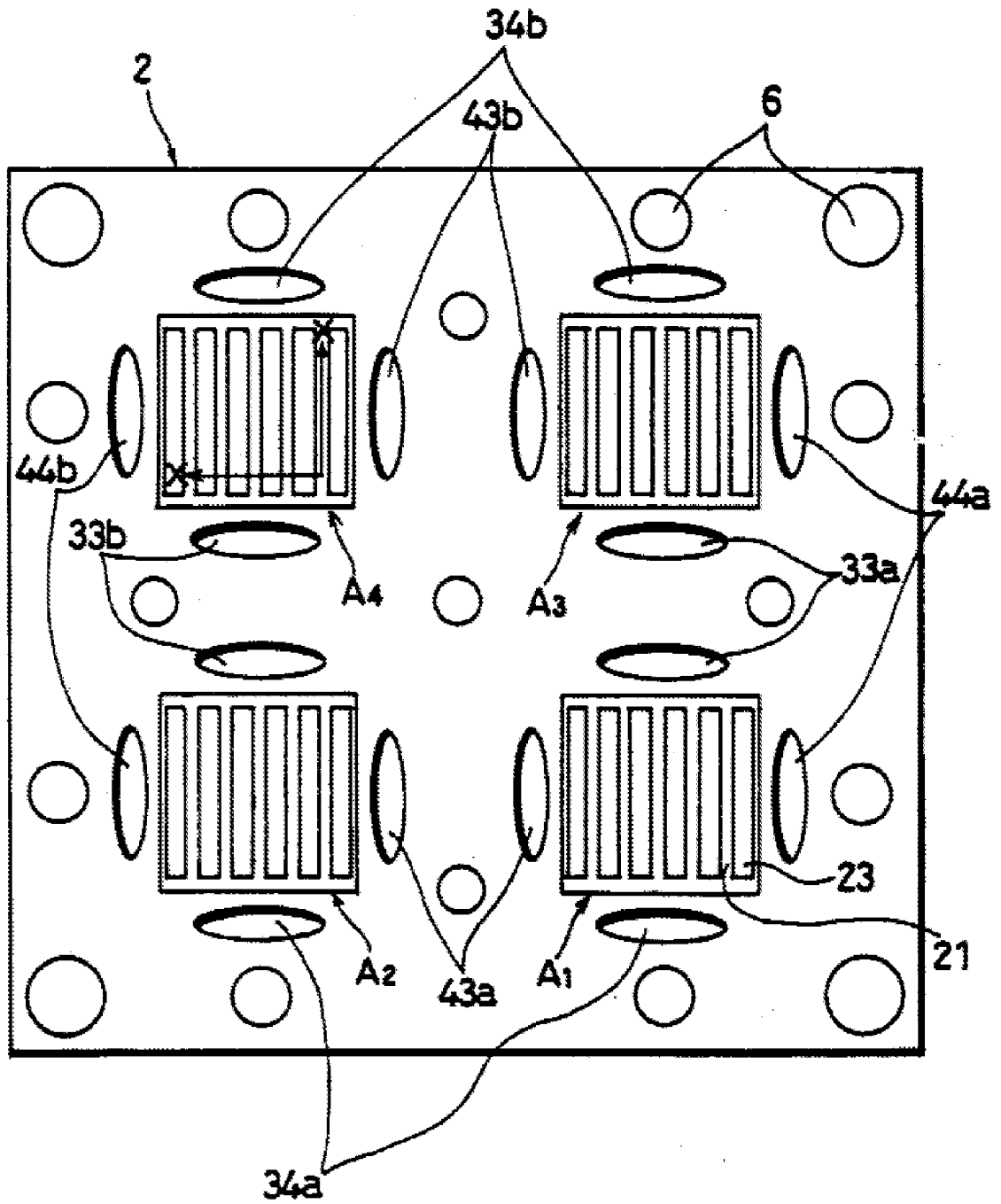
Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Finn et al. as applied to claim 1, further in view of Yasuo et al. (US Pat. No. 5,238,754).

Regarding claims 13 and 14, Finn et al. does not disclose cooling fluid channels on the anode side of the frame and on the cathode side of the frame. However, Yasuo

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et al. discloses cooling gas holes 6 (cooling fluid channels), which move through the front cathode side and the rear anode side of the frame (col. 3 line 54-col. 4 line 7). The cooling gas holes 6 would inherently carry out endothermic processes in the fuel cell.

Fig. 2



Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JACOB MARKS whose telephone number is (571)270-7873. The examiner can normally be reached on Monday through Friday 7:30-5:00 alt Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on 571-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jacob Marks/

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/Brian J. Sines/

Supervisory Patent Examiner, Art Unit 1795